



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/046,903 | 01/17/2002 | Masafumi Sano | 03560.002157 D1 | 3549 |
| 5514 | 7590 | 02/02/2004 | EXAMINER | |
| FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112 | | | WONG, EDNA | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1753 | |

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------|--------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/046,903 | SANO ET AL. |
| Examiner | Art Unit | |
| Edna Wong | 1753 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-30 and 46-57 is/are pending in the application.
- 4a) Of the above claim(s) 16-30 and 46-57 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-15 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. 09/074,699.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) Interview Summary (PTO-413) Paper No(s) _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

Election/Restrictions

Applicant's election with traverse of Group I, claims 1-15, in the Response dated January 12, 2004 is acknowledged. The traversal is on the ground(s) that the search for all groups will be coextensive, that no separate status in the art was shown. This is not found persuasive because a method for producing a zinc oxide thin film is also originally classified in class 438 (see Arao et al., US Patent No. 5,804,466).

Claim 1 in Arao et al. and the present invention differ only in the aqueous solution used, and thus, presented different searches and classifications into different classes (class 205 or class 438) which thus, shows a separate status in the art.

The requirement is still deemed proper and is therefore made FINAL.

Accordingly, claims 16-30 and 46-57 are withdrawn from consideration as being directed to a non-elected invention.

Specification

The disclosure is objected to because of the following informalities:
page 1, under "CROSS-REFERENCE TO RELATED APPLICATION", please amend the number "1999" to -- 1998 --.

page 1, under "CROSS-REFERENCE TO RELATED APPLICATION", please insert -- now US Patent No. 6,346,184 B1 -- after the number "1999".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

line 3, it is unclear what is meant by “zinc ammonia complex ions”.

Are these ions of a complex of zinc and ammonia, or are these ions that complex with zinc and ammonia?

Claim 6

lines 3-4, it is unclear what is meant by “zinc ammonia complex ions”.

Are these ions of a complex of zinc and ammonia, or are these ions that complex with zinc and ammonia?

Claim 11

line 3, it is unclear what is meant by “zinc ammonia complex ions”.

Are these ions of a complex of zinc and ammonia, or are these ions that complex with zinc and ammonia?

II. Claims 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps that make the photovoltaic device.

The preamble of claim 6, line 1, recites "A method of producing a photovoltaic device". However, the body of the claim recites forming a zinc oxide thin film and a semiconductor layer. Can only the zinc oxide thin film and semiconductor layer be a photovoltaic device?

III. Claims 11-15 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps that make the semiconductor device.

The preamble of claim 11, line 1, recites "A method of producing a semiconductor device". However, the body of the claim recites forming a zinc oxide thin film on a conductive substrate. Can the zinc oxide thin film on the conductive substrate alone be a semiconductor device? Which part is semiconducting?

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims **1-5** define over the prior art of record because the prior art does not teach or suggest a method of producing a zinc oxide thin film comprising passing a current between a conductive substrate immersed in an aqueous solution containing at least zinc ions, ammonium ions and zinc ammonia complex ions, and an electrode as an anode immersed in the aqueous solution to form a zinc oxide thin film on the conductive substrate.

Claims **6-10** define over the prior art of record because the prior art does not teach or suggest a method of producing a photovoltaic device comprising the steps of: forming a zinc oxide thin film on a conductive substrate immersed in an aqueous solution containing at least zinc ions, ammonium ions and zinc ammonia complex ions by passing a current between the conductive substrate and an electrode as an anode immersed in the aqueous solution; and forming a semiconductor layer.

Claims **11-15** define over the prior art of record because the prior art does not teach or suggest a method of producing a semiconductor device substrate comprising passing a current between a conductive substrate immersed in an aqueous solution containing at least zinc ions, ammonium ions and zinc ammonia complex ions, and an electrode as an anode immersed in the aqueous solution to form a zinc oxide thin film on the conductive substrate.

The prior art does not contain any language that teaches or suggests the above. Arao *et al.* teaches a solution containing a hydrated zinc nitrate and sucrose (col. 17, line 63 to col. 18, line 23). Ammonia was added to the metal forming tank **826** (col. 18,

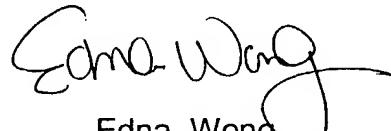
lines 39-49). Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a *prima facie* case of obviousness cannot be established.

Claims 1-15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (572) 272-1300.



Edna Wong
Primary Examiner
Art Unit 1753

EW
January 23, 2004